



OPEN SOURCE NETWORKING DAYS

Tungsten Fabric on K8s

Moh Ahmed / CENGN Cloud Infrastructure Engineer



- About Me
- Tungsten Fabric
 - History
 - Architecture
 - Containerization
- Installation Methods
- Demo
- Multi-Cloud Support

About Me



- Graduated from Carleton University
 - Computer Systems Engineering
- Worked with containers for a couple of years
- Joined CENGN 6 months ago



Tungsten Fabric History



2014

v1



- OpenStack networking at scale
- NFV service chaining
- Analytics collection/querying
- REST API and GUI

2015

v2



- Docker & ESXi runtime support
- VMware vSphere support
- DPDK vRouter
- Prototype with Kubernetes v1.1

2016

v3



- Node-port service chaining
- Improve analytics with Kafka
- LBaaS
- ToR switch as OVSDB gateway

Tungsten Fabric History



2017
v4

March
2018

2018
v5+



*tungsten*fabric

- Containerized the project
- Provided Kubernetes and CNI Support
- OpenShift and Mesos support
- New installation with Ansible or Helm

- Security focus
- Multi-cloud gateways
- Switching fabric focus
- Declarative network as code



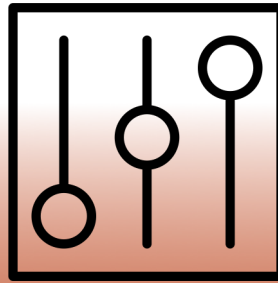
A stylized world map is centered on the image, rendered in a hand-drawn, sketchy style. The continents are colored in three distinct shades: North America and Europe are light blue, South America and Africa are light red, and Asia and Australia are light blue. The map is set against a dark blue background. Overlaid on the map is a circular flow of six white arrows. The arrows start from the left side of the map (near North America), curve upwards and to the right, then downwards and to the right, then downwards and to the left, then upwards and to the left, then upwards and to the right, and finally back to the starting point, creating a continuous loop. The word "Architecture" is written in a bold, white, sans-serif font, positioned in the lower-left quadrant of the image, partially overlapping the map and the circular flow of arrows.

Architecture

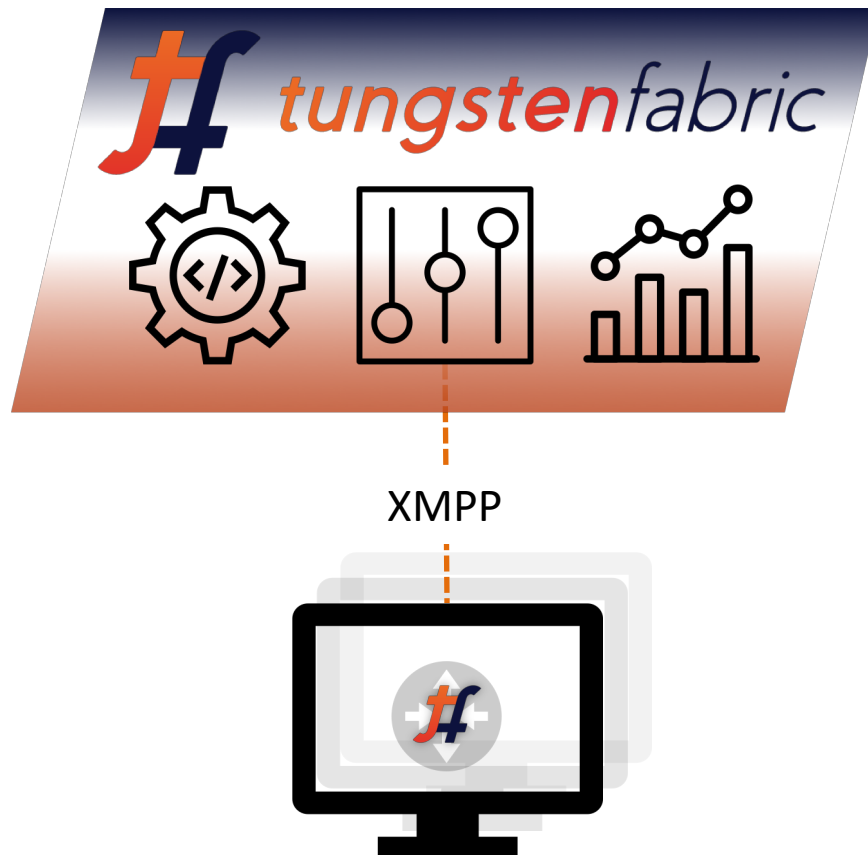
Stitching the Pieces



tungstenfabric



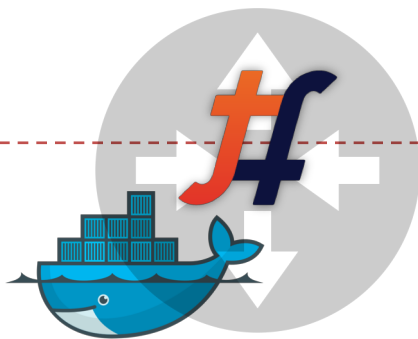
Stitching the Pieces



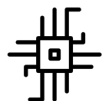
Stitching the Pieces



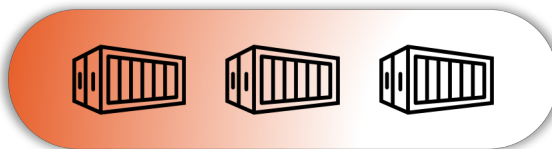
- Exchanging control state with the Control nodes
- Receiving low-level configuration state from the Control nodes
- Reporting analytics state



- Encapsulate/decapsulate packets to/from overlay network
- Assigns packets to routing instances



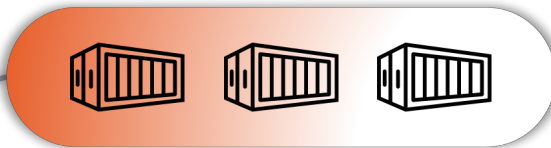
Stitching the Pieces



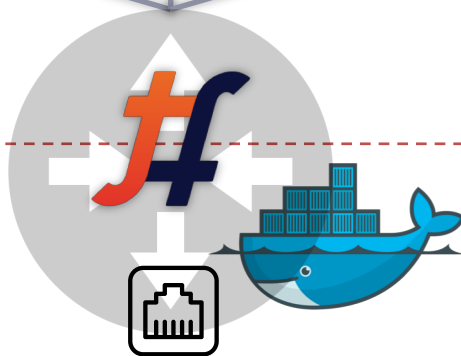
192.168.44.2



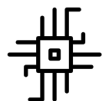
192.168.44.4



192.168.44.6

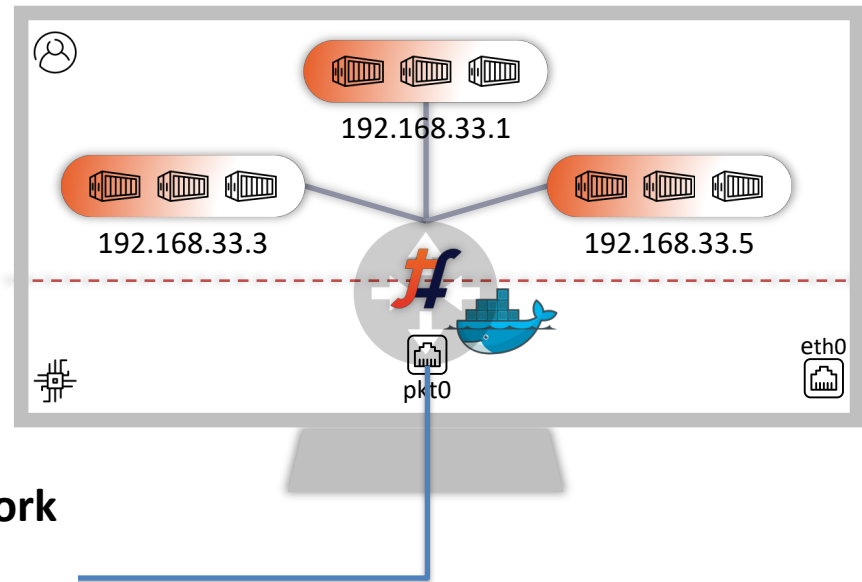
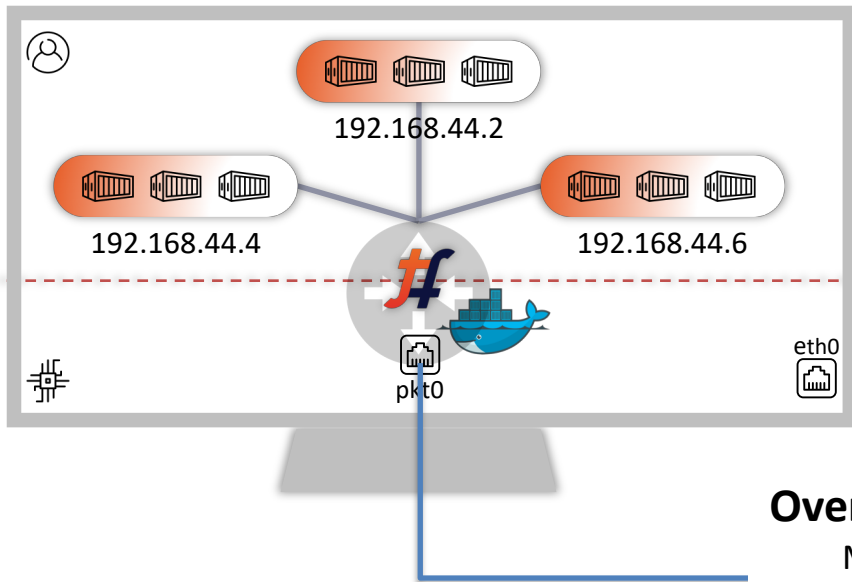


pkt0



eth0

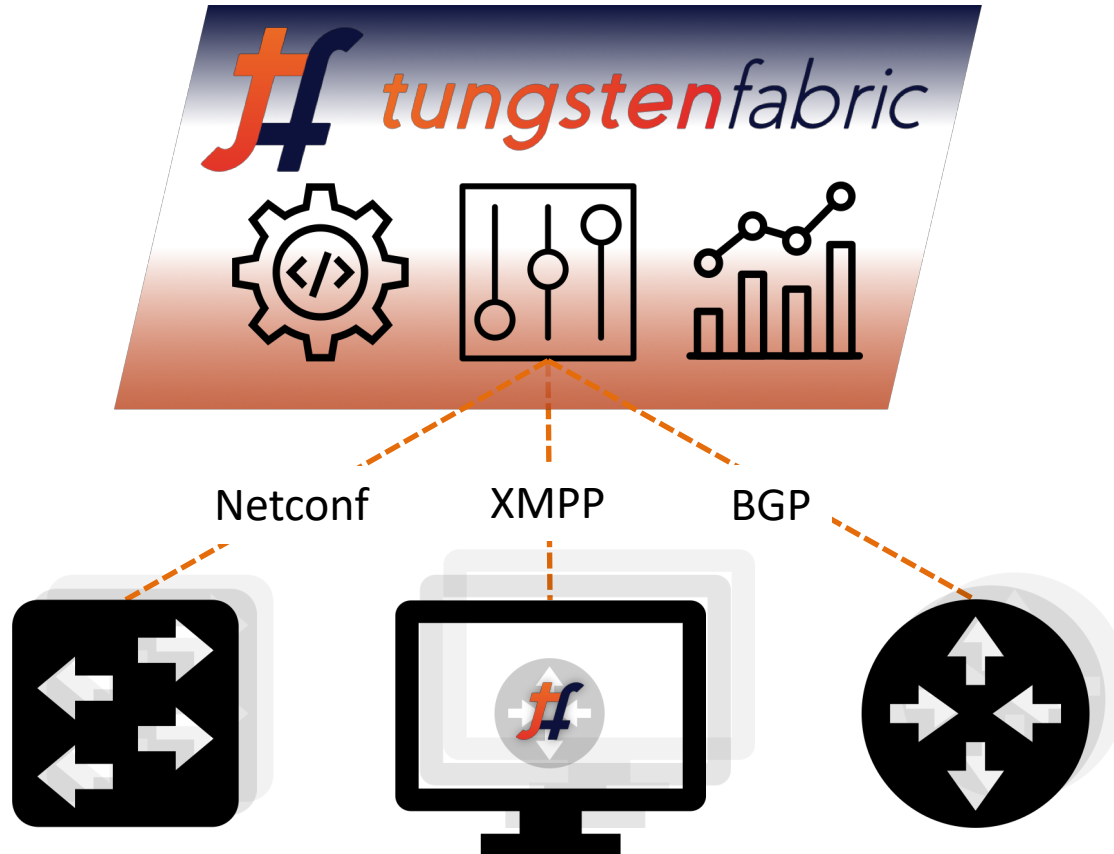
Stitching the Pieces



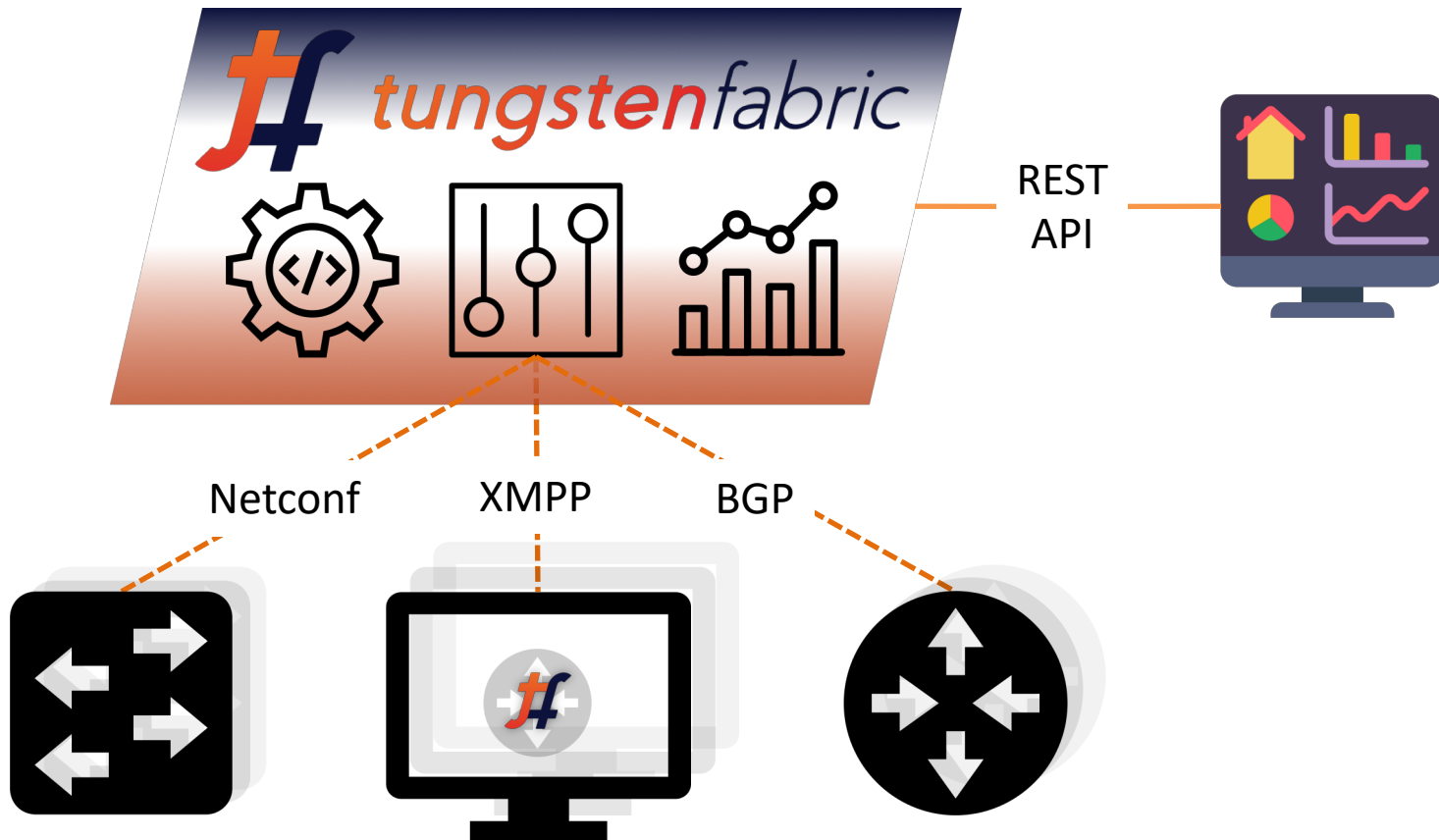
Overlay Network

MPLSAoUDP
MPLSoGRE
VXLAN

Stitching the Pieces



Stitching the Pieces



User Experience

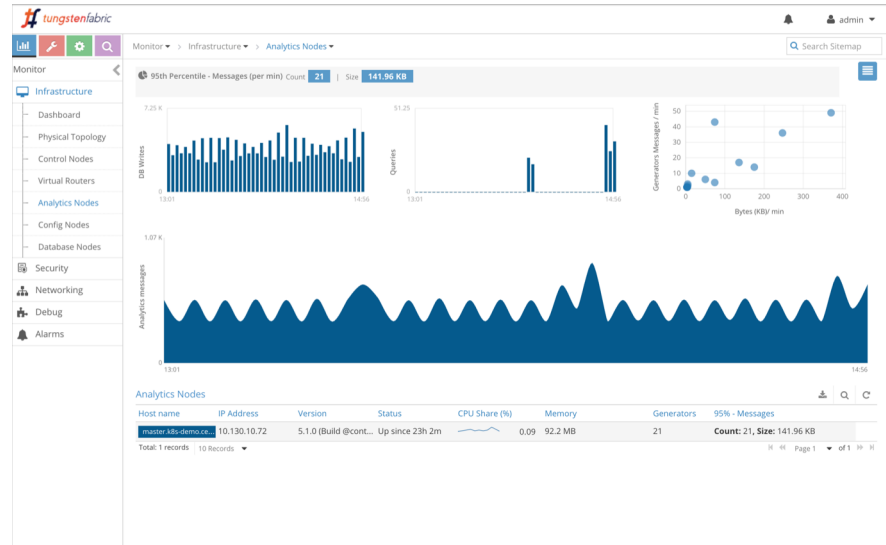


NORTH-BOUND API



- REST API
- HTTPS authentication and role-based authorization
- Used for GUI
- Used for declarative configurations as code
- Generated from data model

GUI



Stitching the Pieces



CNI



NEUTRON
an OpenStack Community Project



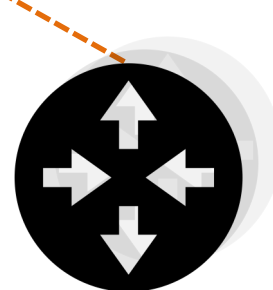
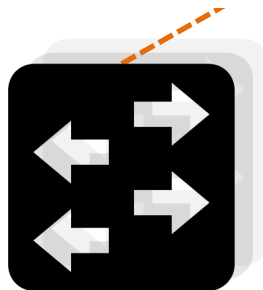
REST
API



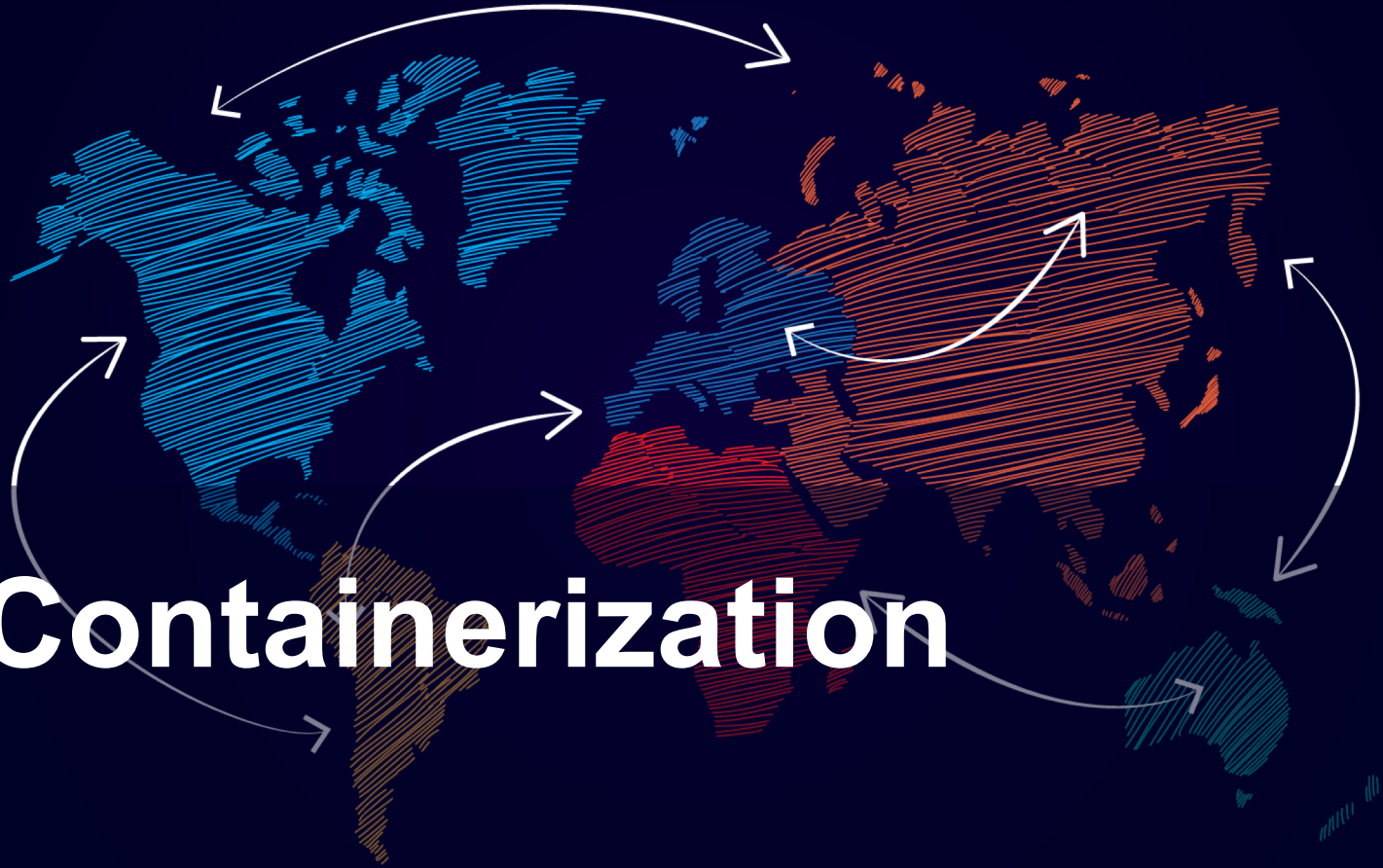
Netconf

XMPP

BGP



Containerization



Container Architecture



AnalyticsDB



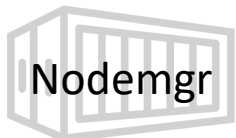
cassandra



Apache Zookeeper



kafka



Nodemgr

Analytics



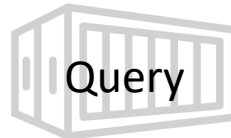
Analytics API



Alarm Gen



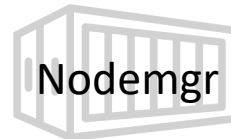
Collector



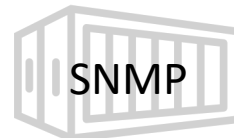
Query



Topology



Nodemgr



SNMP

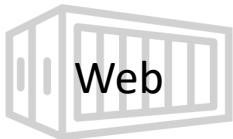


redis

Container Architecture



WebUI



Web



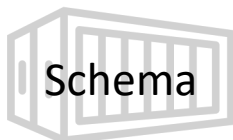
Job



Config



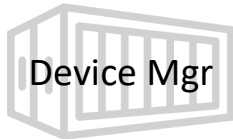
Config API



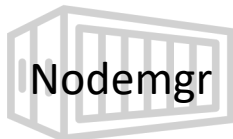
Schema



SVC Mon



Device Mgr



Nodemgr

ConfigDB



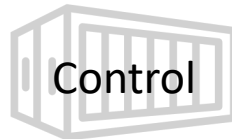
cassandra



Apache Zookeeper



Control



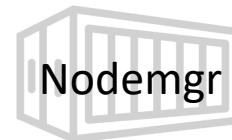
Control



Named



DNS

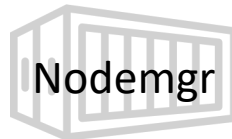


Nodemgr

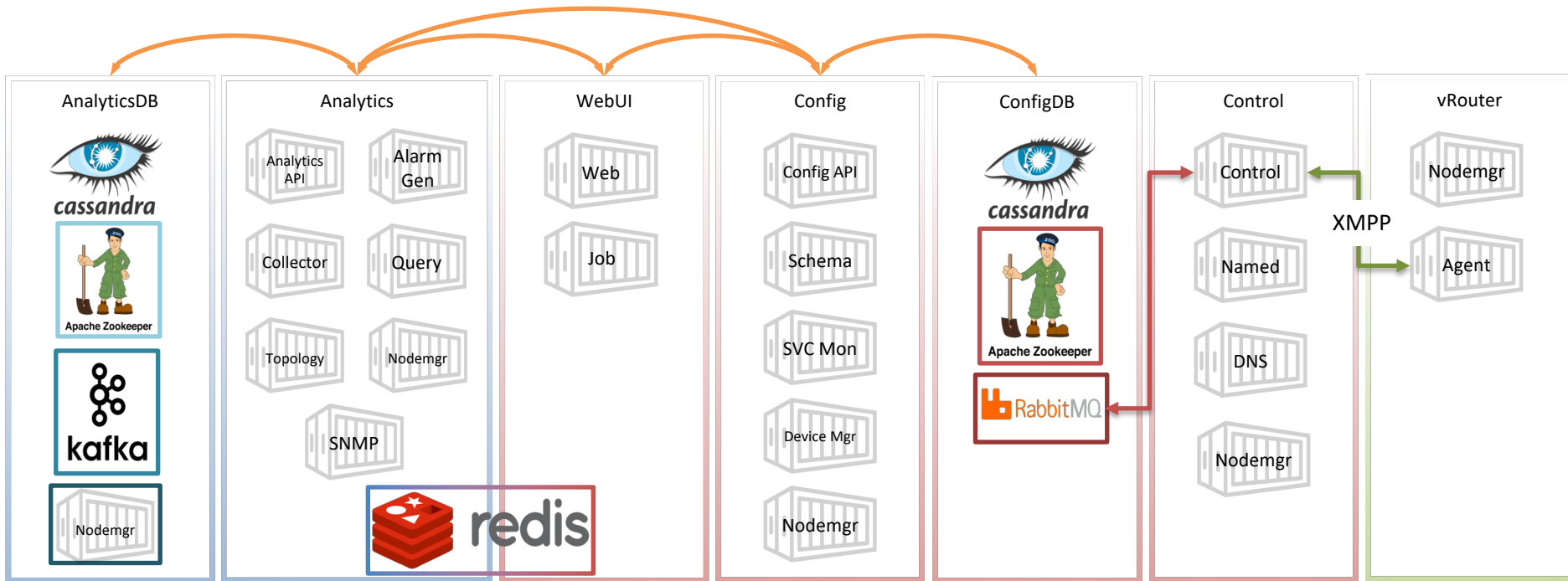
Container Architecture



vRouter



Container Architecture



Various Installation Methods



ANSIBLE

Ansible playbook to deploy TF binaries



Helm charts to easily operate TF components on Kubernetes



OPENSIFT

Install-time option with OpenShift to deploy with TF

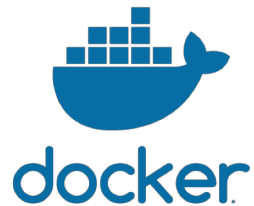


Docker images on DockerHub to deploy TF binaries



Commercial integrations into lifecycle tools like RH OpenStack Director

Kubernetes Installation



Easily deployed through a couple of YAML config files using public Docker images

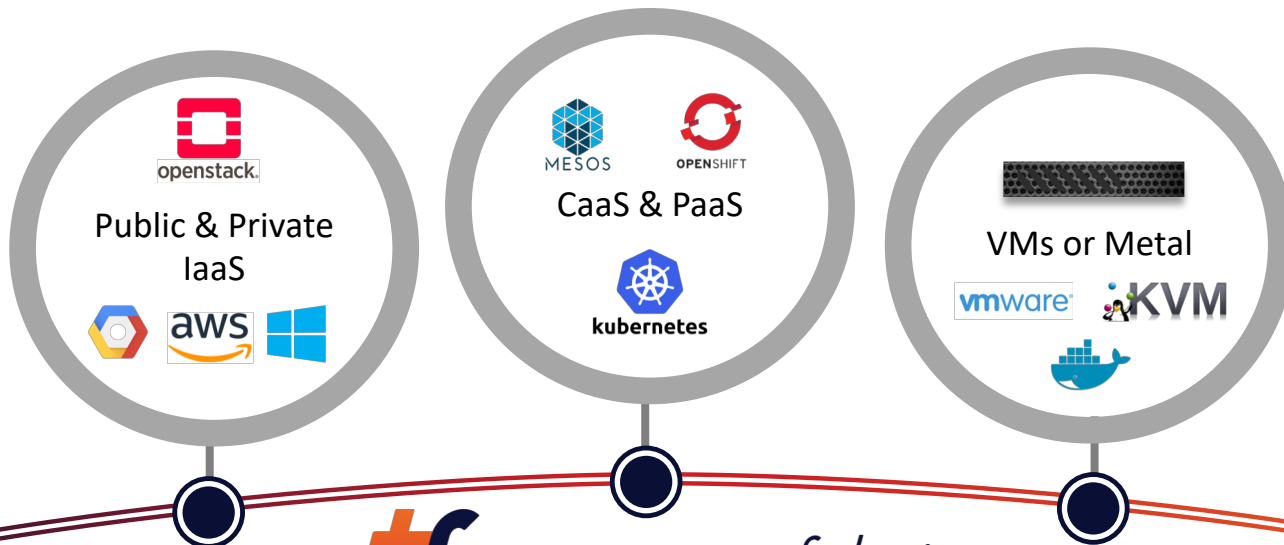
Demo





RULE THEM ALL WITH ONE

automated secure open SDN



*tungsten*fabric

Thank You

